Translation

PCT/JP2003/007614

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RDC51M/PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/JP2003/007614	International filing date (*day/month/year*) 16 June 2003 (16.06.2003)	Priority date (*day/month/year*) 25 November 2002 (25.11.2002)
International Patent Classification (IPC) or national classification and IPC B01J 23/20, C07C 67/08, 69/14		
Applicant JAPAN SCIENCE AND TECHNOLOGY AGENCY		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 22 September 2003 (22.09.2003)	Date of completion of this report 11 June 2004 (11.06.2004)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP2003/007614

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed

☐ the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the claims:

pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the drawings:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP03/07614

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-14	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-14	NO
Industrial applicability (IA)	Claims	1-14	YES
	Claims		NO

2. Citations and explanations

Document 1: Takemi YOSHIDA et al., "Shinki 2-jigen Kotaisan Sen'i Kinzoku Sankabutsu Sheet ni yoru Kakushu Shokubai Hanno no Kento," CSJ: The Chemical Society of Japan Dai 81 Shunki Nenkai-Koen Yokoshu I, March 11, 2002

Document 2: Toshikazu HARA et al., "Kotaisan to shite no Kinzoku Sankabutsu Nano Sheet," Shokubai, June 10, 2002, Vol. 44, No. 4

Document 3: Atsushi TAKAGAKI et al., "Titan Niobate Sankabutsu Sheet no Kozo to Kotai Sansei," Dai 90 kai Shokubai Toronkai, Toronkai A Yokoshu, September 10, 2002

Based on the descriptions in documents 1-3 cited in the international search report, the inventions of claims 1-14 lack an inventive step.

Documents 1-3 describe solid acid catalysts for ester dehydration condensation wherein a titanium niobate oxide nano-sheet is coagulated, and the Ti/Nb atomic ratio z is 0.818, 1 or 2 (see document 1, page 165; document 2, pages 240 to 245; document 3, page 183). In addition, documents 1-3 describe the use of tetrabutyl ammonium as the organic ammonium, and document 2 states that the surface area of the catalyst is 150 $m^2 g^{-1}$.

Documents 1-3 do not describe a catalyst in which z (=x/y) has a value of $1 < z < 1.5$, but as stated in documents 1 and 3, the investigation of changes in catalytic activity associated with changes in has been conducted in the past. Therefore, optimizing or qualifying the preferred numerical ranges of x, y, and z, and restricting them to the numerical ranges of claims 1, and 2 are merely demonstrations of the normal inventive capacity of persons skilled in the art.

In addition, the effect of the present invention of improving the ester production rate to approximately 1.3 times that of prior art by restricting the numerical values of x, y, and z is a matter that can easily be predicted by persons skilled in the art (see Figures in documents 1 and 3).

Documents 1 and 2 do not describe the concentration of acid used during proton exchange on the titanium niobate oxide nano-sheet, but the preferred concentration is merely a matter to be established as needed by persons skilled in the art.